



**National Aeronautics
and Space Administration**

**July 16, 1999
NRA 99-OSS-03**

Research Announcement

ASTRO-E Guest Observer Program Cycle 1

Proposals Due:

September 17, 1999

OMB Approval No. 2700-0087

ASTRO-E Guest Observer Program Cycle 1

NASA Research Announcement
Soliciting Proposals for Basic Research

NRA-99-OSS-03
Issued: July 16, 1999
Proposal Due Date: September 17, 1999

Office of Space Science
National Aeronautics and Space Administration
Washington, DC 20546

ASTRO-E Guest Observer Program Cycle 1

This NASA Research Announcement (NRA) solicits basic research proposals for participation in the National Aeronautics and Space Administration (NASA) program for the conduct of space science observations and subsequent analysis of the resultant scientific data from the joint Japanese-U.S. ASTRO-E X-ray observatory.

The primary goal of the ASTRO-E mission is the investigation of the nature and physics of astrophysical objects as revealed through their high energy emission. The ASTRO-E mission will emphasize high-resolution, high-throughput X-ray spectroscopy in the 0.4-12 keV band, with particular attention to the 6-8 keV Iron K emission band. A broad range of astrophysical objects will be studied, including stars, X-ray binaries, diffuse Galactic emission, active galactic nuclei, and clusters of galaxies.

This NRA is the first announcement for the ASTRO-E Guest Observer (GO) Program and solicits proposals for Phase Ib of the mission. The ASTRO-E launch is scheduled for January 24, 2000. The mission will be divided into two phases. Phase I of the mission is further divided into three subphases. During Phase I, emphasis will be placed on observations requiring the cryogenically cooled X-Ray Spectrometer (XRS). Phase I will last until the XRS cryogen is exhausted (approximately two years after launch). In Phase Ia, lasting the first six months of the mission, the observatory will undergo on-orbit calibration and performance verification. Also during that time, a number of scientific observations will be performed by members of the international ASTRO-E Science Working Group (SWG). During Phase Ib and Ic, each lasting approximately nine months, observation time will be shared by the SWG and Guest Observers. In Phase Ib, the allocation of observing time will be 34 percent for the SWG and 66 percent for GO's; in Phase Ic this allocation becomes 20 percent and 80 percent for the SWG and GO's, respectively. The time allocated to Guest Observers in both Phase Ib and Ic will be divided equally between U.S. and Japanese scientists. During Phase II, which lasts from the time the XRS cryogen is exhausted until the end of the mission, the scientific emphasis will shift to the use of the X-ray Imaging Spectrometer (XIS) and Hard X-ray Detector (HXD). During this phase, 60 percent of the observing time will be awarded to Japanese observers, 25 percent to U.S., and 15 percent to collaborative teams. NASA will be responsible for allocating the U.S. share of ASTRO-E observing time during the mission via this and subsequent solicitations. Allocation of the Japanese observing time will be the responsibility of Japan's Institute of Space and Astronautical Science (ISAS). This Announcement solicits observations for Phase Ib. It is anticipated that further opportunities for participation in the ASTRO-E GO program will be announced on an approximately annual basis.

Participation is open to all categories of organizations within the U.S., including educational institutions, NASA Centers, profit and nonprofit organizations, and other Government agencies. The nature of the bilateral agreement between the U.S. and Japan prevents NASA from considering proposals from organizations outside the U.S. Letters of Intent to Propose are not required. Proposals will be evaluated by a scientific peer panel with a goal of announcing the selections three months after proposals are due. A detailed schedule specifying proposal deadlines and important mission milestones is provided in Appendix C to this NRA.

Proposers whose investigations are selected will have proprietary use of their data for 12 months after receipt of the data after which time the data will be placed in a public data archive that is accessible to other interested investigators.

Funds for awards under this NRA are expected to be available subject to the annual NASA budget cycle. The Government's obligation to make awards is contingent upon the availability of appropriated funds from which payment for award purposes can be made and the receipt of proposals that the Government determines are acceptable for award under this NRA. The total amount of funding available for the support of GO's for the present observing opportunity is anticipated to be \$2.5 million, which is expected to fund approximately 50 investigations.

The proposal review will be conducted in two stages. During the first stage, a review panel will evaluate the scientific and technical merits of each investigation proposed to NASA to consider the appropriateness of using the ASTRO-E XRS for achieving the proposed scientific objectives. This panel will provide NASA with a priority-ordered list of recommended targets. The final target list will be produced by merging the NASA Guest Observer list with a similar one produced by a Japanese national review and with the list of targets preselected by the ASTRO-E Science Working Group. In the second stage of the selection process, investigators whose proposals have targets selected for observation will be asked to submit a proposed budget to support their investigation. In consultation with the Project Scientist, the Program Scientist will perform an assessment of the realism and reasonableness of the proposed budgets in the context of the available GO funds. Based upon this assessment and the Stage 1 scientific/technical evaluation, the Program Scientist will then recommend a set of investigations (with suggested funding levels) for selection to the NASA Selecting Official.

Further details relevant to the ASTRO-E Guest Observer Program are included in the appendices, which are described briefly below. Note that to receive these, you must request or download all appendices, either by mail, electronic mail, telephone, or FAX (addresses and numbers follow). Appendix A gives an overview of the mission and describes the observing opportunity. Appendix B gives the general instructions for responding to NASA Research Announcements. Appendix C, which supersedes and augments Appendix B, provides additional, mission-specific information on proposal submission and subsequent evaluation, selection, and implementation; the information in Appendix C applies to this NRA only. Appendix D contains the forms and instructions needed to prepare proposals in response to this NRA. The technical description of the satellite and instruments, although not a part of this NRA, contains information which is necessary for understanding ASTRO-E and its instruments and thus for preparing appropriate guest observer proposals. The technical description is available as a separate document through the ASTRO-E web site or upon request from the ASTRO-E Guest Observer Facility (GOF; see below).

The appendices and associated documents are most readily accessed over the World Wide Web (<http://astroe.gsfc.nasa.gov/>). Hard copies will be mailed to those requesting them via E-mail, regular mail, fax, or telephone. Requests should be made at the earliest opportunity to ensure receipt early in the proposal preparation period.

IDENTIFIER: NRA 99-OSS-03

PROPOSAL DUE DATE: September 17, 1999

NUMBER REQUIRED: Original and 15 copies

SELECTING OFFICIAL: Director
Research Program Management Division
Office of Space Science

SUBMIT PROPOSALS TO: ASTRO-E GOF
Ref: NRA 99-OSS-03
Code 662
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National Aeronautics and Space Administration
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RETRIEVE NRA and APPENDICES ELECTRONICALLY FROM:

World Wide Web: <http://www.hq.nasa.gov/office/oss/>
"Research Opportunities"

NASA very much appreciates your interest and cooperation in participating in the ASTRO-E Guest Observer Program.

Alan N. Bunner
Science Program Director
Structure and Evolution of the Universe

Appendices:

A: ASTRO-E Guest Observer Program Description

B: Guidelines for Responding to NASA Research Announcements for Solicited Basic Research Proposals

C: Additional Information Regarding Proposal Submission, Evaluation, Selection, and Implementation

D: Filling Out ASTRO-E Proposal Forms

ASTRO-E GUEST OBSERVER PROGRAM DESCRIPTION

A.1 MISSION OVERVIEW

ASTRO-E is Japan's fifth x-ray astronomy mission and the third for which the U.S. provided a significant part of the scientific payload. Its five large-area telescopes focus x-rays from a wide energy range onto four x-ray sensitive Charge-Coupled Devices (CCD's) and one x-ray Microcalorimeter. In addition, ASTRO-E carries a nonimaging Hard X-ray Detector (HXD). ASTRO-E will observe a variety of x-ray sources over a very broad spectral bandwidth with moderate spatial resolution and both moderate and high spectral resolution, with particular emphasis on the iron K band. ASTRO-E is the first x-ray mission operating between 0.4 and 12 keV combining ~ 10 eV energy resolution with imaging capability. It is expected to observe typically one or two sources per day. These combined capabilities enable a diverse and exciting program of astrophysical research.

The X-Ray Spectrometer (XRS) is a high resolution imaging spectrometer provided by the NASA Goddard Space Flight Center (GSFC), the University of Wisconsin, Japan's Institute of Space and Astronautical Science (ISAS), and Tokyo Metropolitan University. It is a 16×2 array of microcalorimeters, subtending a 3.9×1.9 arc minute field of view. The XRS has a spectral resolution of approximately 12 eV across its operating band of 0.4 to 12 keV. It is cooled to a temperature of 65 mK via a three-stage refrigerator. The useful life of the XRS is limited by the cryogenic fluid supply; it is expected to be 1.9 years. During that time, the XRS is the primary scientific instrument on board ASTRO-E.

The four identical x-ray CCD cameras are known as the X-ray Imaging Spectrometers (XIS) and are provided by a hardware team from Kyoto University, Osaka University, the Massachusetts Institute of Technology (MIT), and ISAS. Each CCD camera head is based upon a single 1024×1024 pixel, front-side illuminated CCD chip, manufactured at MIT Lincoln Laboratory. The field of view of each camera is 18×18 arc minute. The CCD spatial resolution is defined by the X-ray Telescope (~ 1.6 arc minute half-power diameter); its bandpass is 0.4 to 12 keV. Its spectral resolution is ~ 120 eV at 6 keV, and scales as the square-root of the photon energy.

The high throughput X-Ray Telescopes (XRT's) utilize multiply-nested, thin foil, conical mirrors. The XRT's are supplied by GSFC, Nagoya University, and ISAS and provide a spatial resolution of ~ 1.6 arc minute (half-power diameter) and a broad bandpass, 0.1-12 keV.

The Hard X-ray Detector (HXD) is a low background, collimated detector, covering the 10-700 keV band. It is provided by the University of Tokyo, Japan's Institute of Chemistry and Physics (RIKEN), Japan's National Laboratory for High Energy Physics (KEK), and ISAS. Its spectral resolution ranges from ~ 9 percent at 662 keV to ~ 30 percent at 10 keV. The detector array consists of silicon PIN diodes (sensitive below 50 keV) and GSO well-type phoswich counters (sensitive above 50 keV). Below 100 keV, fine collimators limit the field of view to 17x17 arc minute.

For more information about the instruments, please see the ASTRO-E Technical Description, which can be obtained from the ASTRO-E Guest Observer Facility electronically at <http://astroe.gsfc.nasa.gov> or in hardcopy form.

A.2 OPERATION

ASTRO-E weighs 1600 kg and is scheduled to be launched on January 24, 2000, from Kagoshima Space Center (KSC) in Japan. An ISAS M-V rocket will place ASTRO-E into an approximately circular orbit of inclination about 31 degrees at an altitude of about 550 km. Direct contact between the satellite and the ground station at KSC is possible for five orbits per day. Although the designed lifetime is two years, the mission is expected to last about five years, generating about 1.2 Gbytes of raw data each day. The final mission archive will thus contain on the order of 2 Tbytes of raw data.

ASTRO-E operations are managed by Japanese astronomers and engineers at ISAS. They schedule observations, direct the satellite, collect the data, and monitor the health of the spacecraft and its payload. All data from ASTRO-E are copied and sent to the U.S. ASTRO-E Guest Observer Facility at the NASA Goddard Space Flight Center. There they are processed, distributed to U.S. Guest Observers, and archived.

A.3 MISSION PHASES

The ASTRO-E mission consists of two distinct Phases. During Phase I, the mission science will be driven by the XRS. This phase is expected to last approximately 1.9 years. Phase I is further divided into three subphases, Ia, Ib, and Ic. During Phase Ia, lasting six months, performance verification and calibration will be carried out. All scientific data collected during this phase will be proprietary to the ASTRO-E Science Working Group (SWG) for one year. During Phases Ib and Ic, observing time will be shared between the SWG and Guest Observers. Each will last approximately nine months. Figure 1 depicts how Phase I is subdivided, as well as the allocations for observing time.

Phase II commences once the cryogen used to cool the XRS has become exhausted. The prime scientific instruments then become the XIS and HXD. It is anticipated that this phase will last at least three years. During Phase II, all observation time is awarded via competitive proposals as follows:

- 25 percent for U.S. investigations,
- 15 percent for U.S./Japan collaborative investigations, and
- 60 percent for Japanese investigations.

This apportionment is similar to that for ASCA (short for Advanced Satellite for Cosmology and Astrophysics), a Japanese/US x-ray observatory in its seventh year of operation.

Phase Ia	Phase Ib	Phase Ic
SWG (100%)	GO - US (33%)	GO - US (40%)
	GO - J (33%)	GO - J (40%)
	SWG (34%)	SWG (20%)
	L+0.5 yr Cycle 1	L+1.25 yr Cycle 2

Figure 1: Distribution of time within Phase I of the ASTRO-E mission

This first Announcement covers nine months of ASTRO-E observations (Phase Ib). Observations selected in this round commence in August 2000. Sixty-six percent of the observing time is available for Guest Observers; the remainder belongs to the ASTRO-E Science Working Group. Fifty percent of the time available for Guest Observers will be awarded to U.S. investigators.

A.4 GENERAL OBSERVING PARAMETERS

The Guest Observer phase of the ASTRO-E mission is anticipated to commence in August 2000. Proposals may be submitted only for projects that may be completed within a period of one year; proposals for multiyear projects will not be considered under this NRA. Investigators whose observing proposals are chosen will receive the data that results from their proposal in a form suitable for analysis. One year later, the data will be placed in a public archive for other interested investigators.

It is anticipated that ASTRO-E will typically perform 1-2 pointings per day. The number of pointings is limited by the long (up to one orbit) settling time required by the attitude control system after a maneuver to a new pointing position. In order to maintain a satellite observing efficiency around 50 percent, this means that the minimum allowable observing time on a particular target is 20,000 seconds. Proposals must take this into account and justify the need for an exposure of this (or longer) duration. In some well justified circumstances, shorter observations (5-10,000 seconds) might be considered. Also, for targets having limited spatial extent (< 1 degree), it will be possible to specify a "raster" observation: multiple brief pointings at slightly offset locations. The total time on a specific region of sky must still exceed the minimum.

There are no restrictions regarding the amount of observing time or the number of targets requested in Guest Observer proposals. A proposal may be submitted for a single target with a relatively short observation time or for a larger program involving multiple targets or a greater amount of observing time. All proposals will be reviewed together in the same peer review, and it is expected that a mix of large, medium, and small programs will be selected. It is anticipated that about 50 investigations containing approximately 80 new observations will be selected from proposals received in response to this Announcement.

Time-critical observations, i.e., observations with scheduling constraints, impose a particular burden on ASTRO-E mission planning. (For further discussion of such observations, see the ASTRO-E Technical Description, section 2, which is available from the ASTRO-E GOF via the World Wide Web). In particular, for “short-lived” phenomena, i.e., phenomena where timing within a spacecraft orbit matters, the ability to observe an event may only be assessed a few weeks prior to scheduling. Too many such time-critical observations would compromise the ability of the mission planning and operations team to effectively schedule the full set of requested observations. Because all time-critical observations drive the scheduling process and, therefore, must receive highest scheduling and scientific priority, their total share must be kept relatively small. For ASTRO-E, about five percent of the time will be made available for truly time-critical observations (observations requiring a specific day, such as coordinated observations). An additional small time fraction will be made available for less constrained time-critical observations, such as regular visits to a source (i.e., monitoring observations), observations that require a specific orbital phase, and observations requiring a specific roll angle.

A small percentage of observing time (~2 percent) has been set aside for Target of Opportunity Observations (TOO’s). Observations in this category are those with high scientific importance of rapidly evolving phenomena whose occurrence is not predictable. Prominent examples are supernovae or x-ray transient outbursts. Proposals for TOO’s are allowed for ASTRO-E. Details regarding the circumstances in which a TOO is “triggered” must be included in the scientific justification and on the target form. TOO’s remain reserved only for the observing cycle in effect; if one is not carried out it must be repropose for subsequent cycles. Data from preapproved TOO’s will be proprietary to the PI for one year. Note that a proposal cannot include both TOO’s and regular observations, even of the same object. Additionally, a mechanism will exist for requesting TOO’s for cosmic events unanticipated by any proposal; data for such serendipitous TOO’s will be placed immediately into the public archive. Further details about proposing for TOO’s, both in response to this announcement and for unanticipated events, can be found in the ASTRO-E Technical Description.

It is anticipated that investigations will be selected covering a variety of topics, including solar system objects, stars, x-ray binaries, supernova remnants, galaxies, clusters of galaxies, active galactic nuclei, and the x-ray background. Sources to be observed during Phase Ia and those planned for observation by the SWG during Cycle 1, as well as tools for searching the observation database, are available via the World Wide Web from the ASTRO-E GOF homepage at:

<http://astroe.gsfc.nasa.gov/>.

Proposers should check whether their targets of interest are to be observed. If this is the case, the need for additional observations of those sources must be justified.

A.5 THE U.S. ASTRO-E GUEST OBSERVER FACILITY

Raw telemetry (ordered coherently with duplicated telemetry removed), together with satellite attitude and position information, is sent from Japan to the ASTRO-E Guest Observer Facility (GOF) at the Goddard Space Flight Center. The GOF will distribute the data (electronically, on tape, or on compact disk (CD)) and support U.S. Guest Observers with their analysis of these data. The ASTRO-E GOF is a part of the Office of Guest Investigator Programs at the Laboratory for High Energy Astrophysics, NASA Goddard Space Flight Center, in Greenbelt, Maryland. The ASTRO-E GOF can also provide additional technical information if needed for the preparation of proposals. In addition, it: receives, validates, and distributes data and calibrations; provides data analysis software; provides expert help and documentation; and creates the U.S. ASTRO-E archive.

**INSTRUCTIONS FOR RESPONDING TO NASA RESEARCH ANNOUNCEMENTS
FOR SOLICITED BASIC RESEARCH PROPOSALS**

NASA Federal Acquisition Regulations (FAR) Supplement (NFS) Version 89.90
Part 1852.235-72 (January 1997)
(accessible through URL <<http://www.hq.nasa.gov/office/procurement/regs/nfstoc.htm>>,
open "Part 1852.228 to 1852.241" from the menu).

(a). General.

- (1) Proposals received in response to a NASA Research Announcement (NRA) will be used only for evaluation purposes. NASA does not allow a proposal, the contents of which are not available without restriction from another source, or any unique ideas submitted in response to an NRA to be used as the basis of a solicitation or in negotiation with other organizations, nor is a preaward synopsis published for individual proposals.
- (2) A solicited proposal that results in a NASA award becomes part of the record of that transaction and may be available to the public on specific request; however, information or material that NASA and the awardee mutually agree to be of a privileged nature will be held in confidence to the extent permitted by law, including the Freedom of Information Act.
- (3) NRA's contain programmatic information and certain requirements which apply only to proposals prepared in response to that particular announcement. These instructions contain the general proposal preparation information which applies to responses to all NRA's.
- (4) A contract, grant, cooperative agreement, or other agreement may be used to accomplish an effort funded in response to an NRA. NASA will determine the appropriate instrument. Contracts resulting from NRA's are subject to the Federal Acquisition Regulation (FAR) and the NASA FAR Supplement (NFS). Any resultant grants or cooperative agreements will be awarded and administered in accordance with the NASA Grant and Cooperative Agreement Handbook (NPG 5800.1).
- (5) NASA does not have mandatory forms or formats for responses to NRA's; however, it is requested that proposals conform to the guidelines in these instructions. NASA may accept proposals without discussion; hence, proposals should initially be as complete as possible and be submitted on the proposers' most favorable terms.
- (6) To be considered for award, a submission must, at a minimum, present a specific project within the areas delineated by the NRA; contain sufficient technical and cost information to permit a meaningful evaluation; be signed by an official authorized to legally bind the submitting organization; not merely offer to perform standard services or to just provide computer facilities or services; and not significantly duplicate a more specific current or pending NASA solicitation.

(b). NRA-Specific Items. Several proposal submission items appear in the NRA itself: the unique NRA identifier, when to submit proposals, where to send proposals, number of copies required, and sources for more information. Items included in these instructions may be supplemented by the NRA.

(c). Proposal Content. The following information is needed to permit consideration in an objective manner. NRA's will generally specify topics for which additional information or greater detail is desirable. Each proposal copy shall contain all submitted material, including a copy of the transmittal letter if it contains substantive information.

(1) *Transmittal Letter or Prefatory Material*.

- (i) The legal name and address of the organization and specific division or campus identification, if part of a larger organization;
- (ii) A brief, scientifically valid project title intelligible to a scientifically literate reader and suitable for use in the public press;
- (iii) Type of organization: e.g., profit, nonprofit, educational, small business, minority, women-owned, etc.;
- (iv) Name and telephone number of the principal investigator and business personnel who may be contacted during evaluation or negotiation;
- (v) Identification of other organizations that are currently evaluating a proposal for the same efforts;
- (vi) Identification of the NRA, by number and title, to which the proposal is responding;
- (vii) Dollar amount requested, desired starting date, and duration of project;
- (viii) Date of submission; and
- (ix) Signature of a responsible official or authorized representative of the organization, or any other person authorized to legally bind the organization(unless the signature appears on the proposal itself).

(2) *Restriction on Use and Disclosure of Proposal Information*. Information contained in proposals is used for evaluation purposes only. Offerors or quoters should, in order to maximize protection of trade secrets or other information that is confidential or privileged, place the following Notice on the title page of the proposal and specify the information subject to the notice by inserting an appropriate identification in the Notice. In any event, information contained in proposals will be protected to the extent permitted by law, but NASA assumes no liability for use and disclosure of information not made subject to the Notice.

Notice

Restriction on Use and Disclosure of Proposal Information

The information (data) contained in [insert page numbers or other identification] of this proposal constitutes a trade secret and/or information that is commercial or financial and confidential or privileged. It is furnished to the Government in confidence with the understanding that it will not, without permission of the offeror, be used or disclosed other than for evaluation purposes; provided, however, that in the event a contract (or other agreement) is awarded on the basis of this proposal, the Government shall have the right to use and disclose this information (data) to the extent provided in the contract (or other agreement). This restriction does not limit the Government's right to use or disclose this information (data) if obtained from another source without restriction.

(3) *Abstract.* Include a concise (200-300 word if not otherwise specified in the NRA) abstract describing the objective and the method of approach.

(4) *Project Description.*

(i) The main body of the proposal shall be a detailed statement of the work to be undertaken and should include objectives and expected significance, relation to the present state of knowledge, and relation to previous work done on the project and to related work in progress elsewhere. The statement should outline the plan of work, including the broad design of experiments to be undertaken and a description of experimental methods and procedures. The project description should address the evaluation factors in these instructions and any specific factors in the NRA. Any substantial collaboration with individuals not referred to in the budget or use of consultants should be described. Subcontracting significant portions of a research project is discouraged.

(ii) When it is expected that the effort will require more than one year, the proposal should cover the complete project to the extent that it can be reasonably anticipated. Principal emphasis should be on the first year of work, and the description should distinguish clearly between the first year's work and work planned for subsequent years.

(5) *Management Approach.* For large or complex efforts involving interactions among numerous individuals or other organizations, plans for distribution of responsibilities and arrangements for ensuring a coordinated effort should be described.

(6) *Personnel.* The principal investigator is responsible for supervision of the work and participates in the conduct of the research regardless of whether or not compensated under the award. A short biographical sketch of the principal investigator, a list of principal publications, and any exceptional qualifications should be included. Omit social security number and other personal items which do not merit consideration in evaluation of the proposal. Give similar biographical information on other senior professional personnel who will be directly associated with the project. Give the names and titles of any other scientists and technical personnel associated substantially with the project in an advisory capacity. Universities should list the approximate number of students or other assistants, together with information as to their level of academic attainment. Any special industry-university cooperative arrangements should be described.

(7) *Facilities and Equipment.*

(i) Describe available facilities and major items of equipment especially adapted or suited to the proposed project, and any additional major equipment that will be required.

Identify any Government-owned facilities, industrial plant equipment, or special tooling that are proposed for use. Include evidence of its availability and the cognizant Government points of contact.

(ii) Before requesting a major item of capital equipment, the proposer should determine if sharing or loan of equipment already within the organization is a feasible alternative.

Where such arrangements cannot be made, the proposal should so state. The need for items that typically can be used for research and non research purposes should be explained.

(8) *Proposed Costs.*

(i) Proposals should contain cost and technical parts in one volume: do not use separate "confidential" salary pages. As applicable, include separate cost estimates for salaries and wages, fringe benefits, equipment, expendable materials and supplies, services, domestic and foreign travel, ADP expenses, publication or page charges, consultants, subcontracts, other miscellaneous identifiable direct costs, and indirect costs. List salaries and wages in appropriate organizational categories (e.g., principal investigator, other scientific and engineering professionals, graduate students, research assistants, and technicians and other non-professional personnel). Estimate all staffing data in terms of staff-months or fractions of full-time.

(ii) Explanatory notes should accompany the cost proposal to provide identification and estimated cost of major capital equipment items to be acquired, purpose and estimated number and lengths of trips planned, basis for indirect cost computation (including date of most recent negotiation and cognizant agency), and clarification of other items in the cost proposal that are not self-evident. List estimated expenses as yearly requirements by major work phases.

(iii) Allowable costs are governed by FAR Part 31 and the NASA FAR Supplement Part 1831 (and OMB Circulars A-21 for educational institutions and A-122 for nonprofit organizations).

(9) *Security.* Proposals should not contain security classified material. If the research requires access to or may generate security classified information, the submitter will be required to comply with Government security regulations.

(10) *Current Support.* For other current projects being conducted by the principal investigator, provide title of project, sponsoring agency, and ending date.

(11) *Special Matters.*

(i) Include any required statements of environmental impact of the research, human subject or animal care provisions, conflict of interest, or on such other topics as may be required by the nature of the effort and current statutes, executive orders, or other current Government-wide guidelines.

(ii) Proposers should include a brief description of the organization, its facilities, and previous work experience in the field of the proposal. Identify the cognizant Government audit agency, inspection agency, and administrative contracting officer, when applicable.

(d). Renewal Proposals

(1) Renewal proposals for existing awards will be considered in the same manner as proposals for new endeavors. A renewal proposal should not repeat all of the information that was in the original proposal. The renewal proposal should refer to its predecessor, update the parts that are no longer current, and indicate what elements of the research are expected to be covered during the period for which support is desired. A description of any significant findings since the most recent progress report should be included. The renewal proposal should treat, in reasonable detail, the plans for the next period, contain a cost estimate, and otherwise adhere to these instructions.

(2) NASA may renew an effort either through amendment of an existing contract or by a new award.

(e). Length. Unless otherwise specified in the NRA, effort should be made to keep proposals as brief as possible, concentrating on substantive material. Few proposals need exceed 15-20 pages. Necessary detailed information, such as reprints, should be included as attachments. A complete set of attachments is necessary for each copy of the proposal. As proposals are not returned, avoid use of "one-of-a-kind" attachments.

(f). Joint Proposals.

(1) Where multiple organizations are involved, the proposal may be submitted by only one of them. It should clearly describe the role to be played by the other organizations and indicate the legal and managerial arrangements contemplated. In other instances, simultaneous submission of related proposals from each organization might be appropriate, in which case parallel awards would be made.

(2) Where a project of a cooperative nature with NASA is contemplated, describe the contributions expected from any participating NASA investigator and agency facilities or equipment which may be required. The proposal must be confined only to that which the proposing organization can commit itself. "Joint" proposals which specify the internal arrangements NASA will actually make are not acceptable as a means of establishing an agency commitment.

(g). Late Proposals. A proposal or modification received after the date or dates specified in an NRA may be considered if doing so is in the best interests of the Government.

(h). Withdrawal. Proposals may be withdrawn by the proposer at any time before award. Offerors are requested to notify NASA if the proposal is funded by another organization or of other changed circumstances which dictate termination of evaluation.

(i). Evaluation Factors

(1) Unless otherwise specified in the NRA, the principal elements (of approximately equal weight) considered in evaluating a proposal are its relevance to NASA's objectives, intrinsic merit, and cost.

(2) Evaluation of a proposal's relevance to NASA's objectives includes the consideration of the potential contribution of the effort to NASA's mission.

(3) Evaluation of its intrinsic merit includes the consideration of the following factors of equal importance:

- (i) Overall scientific or technical merit of the proposal or unique and innovative methods, approaches, or concepts demonstrated by the proposal.
- (ii) Offeror's capabilities, related experience, facilities, techniques, or unique combinations of these which are integral factors for achieving the proposal objectives.
- (iii) The qualifications, capabilities, and experience of the proposed principal investigator, team leader, or key personnel critical in achieving the proposal objectives.
- (iv) Overall standing among similar proposals and/or evaluation against the state-of-the-art.

(4) Evaluation of the cost of a proposed effort may include the realism and reasonableness of the proposed cost and available funds.

(j). Evaluation Techniques. Selection decisions will be made following peer and/or scientific review of the proposals. Several evaluation techniques are regularly used within NASA. In all cases, proposals are subject to scientific review by discipline specialists in the area of the proposal. Some proposals are reviewed entirely in-house, others are evaluated by a combination of in-house and selected external reviewers, while yet others are subject to the full external peer review technique (with due regard for conflict-of-interest and protection of proposal information), such as by mail or through assembled panels. The final decisions are made by a NASA selecting official. A proposal which is scientifically and programmatically meritorious, but not selected for award during its initial review, may be included in subsequent reviews unless the proposer requests otherwise.

(k). Selection for Award.

(1) When a proposal is not selected for award, the proposer will be notified. NASA will explain generally why the proposal was not selected. Proposers desiring additional information may contact the selecting official who will arrange a debriefing.

(2) When a proposal is selected for award, negotiation and award will be handled by the procurement office in the funding installation. The proposal is used as the basis for negotiation. The contracting officer may request certain business data and may forward a model award instrument and other information pertinent to negotiation.

(l). Cancellation of NRA. NASA reserves the right to make no awards under this NRA and to cancel this NRA. NASA assumes no liability for canceling the NRA or for anyone's failure to receive actual notice of cancellation.

ADDITIONAL INFORMATION REGARDING PROPOSAL SUBMISSION, EVALUATION, SELECTION, AND IMPLEMENTATION

The information contained in Appendix C augments and supersedes Appendix B and applies only to this NRA.

C.1 OVERVIEW OF REVIEW PROCESS

The overall proposal review process will be directed by the ASTRO-E Program Scientist in NASA's Office of Space Science. The scientific and technical merits of the proposed investigation will be subjected to peer review using the criteria defined in Section C.3.1.1. The list of targets provisionally recommended for observation will be consolidated with the Japanese program by a U.S./Japanese committee. Following this consolidation, observers whose proposals are recommended for implementation will be notified by E-mail and asked to submit a proposal for the Stage 2 (cost) review as described in Section C.3.2. It is anticipated that the second review will take place within two months after the consolidation meeting. Following the Stage 2 review, those proposers selected for award will be notified of the recommended funding level for their investigation.

C.2 PROPOSAL PREPARATION AND SUBMISSION

C.2.1 Who May Propose

Every ASTRO-E Guest Observer proposal must identify a single Principal Investigator (PI). The intent of this program is to enhance U.S.-Japanese scientific cooperation, in keeping with the bilateral agreement between the U.S. and Japan. Thus, only PI's affiliated with U.S. institutions and located in the U.S. are eligible to propose for ASTRO-E guest investigations through NASA. The requirement of affiliation with a U.S. institution does not extend to Co-Investigators. While collaboration with Japanese investigators is strongly encouraged, no time is explicitly allotted for collaborative investigations. Observation time will be split evenly between proposals with U.S. and Japanese Principal Investigators. It is possible that some targets will be shared by U.S. and Japanese teams, but either a U.S. or a Japanese Prime Principal Investigator will always be named.

Proposals involving a U.S.-Japanese collaborative project to observe a similar source(s) should not be submitted to both the U.S. and Japanese programs even if the formal PI's are explicitly different. A consortium of investigators from the U.S. and Japan may choose to split a large observing program into two separate programs for submission to their respective agencies. In doing so they should also, in the spirit of these rules, split their source lists; each individual proposal submitted to each agency must be capable of being evaluated on its own merit.

Following selection, the ASTRO-E mission timeline team will deal only with the person identified as Principal Investigator or lead Co-Investigator. It will be their duty to respond to any questions about detector usage or observational modes. In the event that the data are to be shared by U.S. and Japanese teams, it is expected that the respective Principal Investigators will consult regarding observing configuration issues.

C.2.2 Proposal Format And Content

C.2.2.1 Stage 1 Proposal

C.2.2.1.1 Proposal Content

The science section must include a standard Cover Page form, the scientific justification (as described below), and one or more Target Forms. The forms can be found in Appendix D. The information in the forms will be entered into a data base that will be used in cataloging and evaluating proposals. The forms must be completed in the format presented.

The abstract on the Cover Page should be limited to 800 characters, including spaces between words, with no embedded commands, i.e., flat ASCII only. If the abstract exceeds this length, it will be truncated automatically at 800 characters when entered into the database. Note that the abstracts and target lists for approved observations will be made available to the scientific community in printed and electronic form.

Proposers should also note that the pointing positions given in the Target Form will be used to point the spacecraft and that care must be exercised in stating these positions. Proposers should specify the coordinates of the center of the XRS field of view, not just a cataloged source position. While for unresolved sources these will coincide, they will often differ in extended sources. Pointing errors as small as 1 arc minute can seriously degrade the data from an observation; slightly larger errors could place a source entirely beyond the XRS field of view. *Positions must be stated in equinox/epoch 2000.*

The Target Number (on the Target Form) refers to the proposer's priority of that particular pointing within a proposed investigation involving multiple pointings. If it is necessary for the peer-review committee to reduce the time allocated to a proposal, an attempt will be made to preserve the highest priority observations.

The scientific justification must consist of no more than four pages. Of these, no more than three can be devoted to proposal text, and no more than two to tables and figures. The justification provides the following information and is to be structured as follows:

1. *Scientific Justification.* State clearly the scientific issue to be addressed, with relevant scientific background and references to previous work. Demonstrate how the proposed ASTRO-E observations and data analysis techniques are expected to address this issue and advance prior knowledge. Justify the use of ASTRO-E observations by explaining how the observations require the unique capabilities of the ASTRO-E XRS. (Suggested text length: two pages.)

2. *Technical Feasibility.* The feasibility of accomplishing the objectives of the proposed investigation with the requested observations, including the degree to which the proposal satisfies ASTRO-E observational constraints will be a significant criterion in the evaluation of proposals. Accordingly, the ASTRO-E GOF staff will subject all proposals to a thorough feasibility assessment. To facilitate this assessment, proposers should show how the proposed ASTRO-E exposure time makes possible the fulfillment of the scientific objectives. State how targets or pointing locations were selected. List assumptions about source intensity, surface brightness, and spectrum. Estimates of both count rates and total counts needed for the investigation must be provided. At a minimum, PIMMS (Portable Interactive Multi-Mission Simulator) should be used to estimate count rates and XSPEC can be used to show how the data will be analyzed. Both PIMMS and XSPEC are available from the ASTRO-E GOF at the web address previously listed. Note that it is in the proposer's best interest to provide sufficient detail to allow a reviewer to understand his/her target brightness assumptions well enough to reproduce the count estimates. The proposer should demonstrate that those estimated counts are sufficient to extract the desired results from the observation. In addition, if time-constrained observations are proposed, the proposer must justify the need and explain the rationale behind the selection of the specific constraint. (Suggested text length: one page)

C.2.2.1.2 Page Restrictions and Quantity

Because of the large number of proposals anticipated in response to this NRA, strict page limits will be enforced. Type should not be smaller than 10 point, and spacing between lines should not be less than 10 points. These four pages and the forms comprise the scientific proposal and should provide the U.S. reviewers and the merging committee with all information necessary for making a complete evaluation. *Reviewers will base their evaluation only on the portion of each proposal that complies with the page limits.*

If required by the proposer's institution, the Cover Page should be signed by an institutional official who is authorized to certify institutional support and sponsorship of the investigation.

Scientific Proposal Contents		
SECTION	PAGE LIMIT	COMMENTS
Cover Page	1	must use form
Target Form	1	must use form
Scientific Problem and Technical Feasibility	4	includes text, figures, tables, and references
Vitae of PI	1	optional

To conserve paper, proposals should be printed double-sided. Fifteen (15) copies of the justification and forms that comprise the proposal should be sent to:

ASTRO-E Guest Observer Program
Code 662
Building 2, Room 250
Goddard Space Flight Center
National Aeronautics and Space Administration
Greenbelt, MD 20771-0001

Proposers should note that electronic submission of proposal text is not allowed.

C.2.2.1.3 Technical Information Resource

The ASTRO-E Technical Appendix is available from the ASTRO-E Guest Observer Facility by direct download via the World Wide Web or by anonymous file transfer protocol (ftp). Technical questions concerning the ASTRO-E mission and requests for assistance in proposal submission may be addressed to Dr. Nicholas E. White, U.S. ASTRO-E Deputy Project Scientist, at:

Dr. Nicholas E. White
U.S. ASTRO-E Deputy Project Scientist
ASTRO-E Guest Observer Facility
Code 662
Goddard Space Flight Center
National Aeronautics and Space Administration
Greenbelt, MD 20771-0001
TEL: (301) 286-8443, FAX: (301) 286-1684
white@milkyway.gsfc.nasa.gov

C.2.2.1.4 Electronic Submission of Forms

All proposers are required to submit the contents of their Cover Page and Target Form electronically. Proposers who do not have access to electronic communications should contact Dr. White at the address in Section C.2.2.1.3 at least two weeks before the proposal due date. Electronic submission facilitates efficient proposal processing and reduces the likelihood of the introduction of transcription errors into the proposal and observation databases. For electronic forms submission, the ASTRO-E Guest Observer Facility is making available Remote Proposal Software (RPS), which is the easiest method for a proposer to comply with the electronic submission requirement. Access to RPS is described in Appendix D.

C.2.2.2 Stage 2 Proposals

A cost proposal will be requested for each investigation containing targets selected for observation and that requires financial support from NASA. Investigations will be funded for a period of one year commencing nominally upon completion of the proposed observation(s). Proposers must use the budget form enclosed in Appendix D. In addition, proposers may include a cost section prepared according to the guidelines of the institution submitting the proposal, which should contain:

1. The name of the corresponding scientific proposal, the NASA-assigned proposal number, and the name of the Principal Investigator.
2. Cost estimates for direct labor, including individual person-months and rates for the personnel involved.
3. Estimated costs for equipment, material, and computer services, including type of computer and number of hours of mainframe computer use. Itemize items over \$500.

4. Travel costs – Itemize trips, including travel the ASTRO-E GOF. In general, only one trip per team member to a professional society meeting will be supported. Travel to Japan is, in general, not required nor necessary since the U.S. and Japan are using the same analysis software.
5. Overhead costs and rates.
6. Other costs, with explanation.
7. Contributions from any cost-sharing plan.
8. Total cost of support being requested from NASA.
9. Subgrants to be awarded directly from NASA to Co-Investigators at institutions other than that of the PI. The total dollar amount of these subgrants must be reflected in the overall cost of the proposal.

In addition to the budget breakdown, the cost proposal must contain:

1. A copy of the Cover Page from the Stage 1 proposal, endorsed by an appropriate institutional official.
2. For any Co-Investigator requesting funding, and who is located at a different institution from the PI, a one-page budget summary. Budgets will be accepted from the PI institutions only; separate budgets from the Co-Investigator institutions will not be considered.
3. A complete list of awarded and pending research funding support from NASA or other sources for the Principal Investigator, and all Co-Investigators requesting support. The information needed includes: Agency, Grant/Contract Number, Title, Amount, Starting and Ending Dates, and Level of Effort (percent).
4. A justification, not to exceed one page, of the requested budget. This justification should allow the budget review panel to assess the degree of the necessity of each budget item.
5. A detailed breakdown of the responsibilities of the various investigators who are requesting funding.

Cost Proposal Contents

SECTION	PAGE LIMIT	COMMENTS
Cover Page	1	Institutional endorsement required
Budget Summary	1	Use form provided
Co-I Budget Summary	As needed	1 page per Co-I
Budget Justification	1	
Breakdown of PI and Co-I roles	1	If needed
Current and Pending Funding	1	As needed

C.3.PROPOSAL EVALUATION, SELECTION AND IMPLEMENTATION

C.3.1 Stage 1 Proposal Evaluation and Selection

C.3.1.1 Evaluation Criteria

The following criteria supersede the criteria given in Appendix B. They apply only to the evaluation of proposals submitted in response to this NRA and will be weighted as follows: the first three factors will be of approximately equal weight and together constitute three-fourths of the proposal's score. The last two factors taken together will be of approximately equal weight and constitute one-fourth of the proposal score.

- The overall scientific merit of the investigation.
- The suitability of using the ASTRO-E observatory and data products for the proposed investigation, including the degree to which the investigation exploits the mission's unique capabilities. In this latter regard, primary emphasis will be placed upon the degree to which the proposed investigation effectively utilizes the XRS and resulting data products.
- The feasibility of accomplishing the objectives of the proposed investigation with the requested observations, including the degree to which the proposal satisfies ASTRO-E observational constraints and the feasibility of the proposed analysis techniques.
- The relevance of the proposed research to NASA's Space Science program.
- The competence and relevant experience of the principal investigator and any collaborators as an indication of their ability to carry the investigation to a successful conclusion, including the timely publication of refereed scientific journal papers.

C.3.1.2 Evaluation and Selection Process

There are two steps in the evaluation of ASTRO-E observation (Stage 1) proposals submitted in response to this Announcement. First, a NASA peer panel will review them according to the evaluation criteria specified in the preceding section. Second, a Japanese/U.S. merging committee, comprised of members of the U.S. and Japanese ASTRO-E Project team and representatives of the U.S. Guest Observer community (selected from the NASA peer panel) will eliminate the duplication between targets submitted to the U.S. and Japanese programs.

The task of the ASTRO-E merging committee is to integrate the two national observing proposal sets into the ASTRO-E observing program. This observing program should be devoid of unnecessary duplications among the nationally defined observing programs. Selections made between overlapping proposals will use the priorities assigned by the NASA and Japanese review committees.

A substantial oversubscription of ASTRO-E observing time is expected. With the above scheme, most of the reduction in the oversubscription will occur at the national level of proposal review. The most important criterion for the assessment by the national proposal evaluation committees is the scientific merit of the proposed research. However, the feasibility of the proposed observations, as well as observational constraints that may overburden the ASTRO-E mission planning, will also be taken into account in the final selections.

C.3.1.3 Implementation of Approved Observing Programs

The set of proposals approved by the merging committee will be placed into an observation database. It is likely that observational details, such as XIS mode and XRS filter selection, will need to be worked out with a PI prior to the observation. Each observation will be assigned a unique identifying (sequence) number. It is the responsibility of the ASTRO-E mission planning and operations team at ISAS to produce a mission timeline using all approved observation requests. The process of mission timeline generation is split into two parts. First, a long term mission timeline (LMTL), covering about six months, will be generated; and second, about 2 weeks prior to the execution of the observations, a short term mission timeline (SMTL) will be produced on the basis of the LMTL. The SMTL is used for the generation of the required spacecraft commands. Note that targets are scheduled initially only to within a 10-day period. Thus, any observations requiring stronger time constraints should be marked “time critical.”

Guest Observers should also be aware that observations of their targets will, under most circumstances, be carried out contiguously: once an observation begins, the satellite will not be moved until the observation has been completed. Observations that specifically request discontinuity, e.g., for monitoring or phase coverage, are exceptions.

Investigators whose proposals are chosen will receive the data that result from their proposal in a form suitable for scientific analysis. One year later, the data will be placed in a public archive and, thus, will be available to other interested investigators.

C.3.2 Stage 2 Proposal Evaluation and Selection

Approximately 30 days after notification by NASA that targets contained in their Stage 1 proposal have been selected for observation, Stage 2 (cost) proposals will be due. A Budget Summary form, enclosed in Appendix D of this NRA, must be completed and included with the Stage 2 proposal. In addition to the overall scientific/technical rating of the proposed investigation from the Stage 1 review, the primary criterion used in the Stage 2 evaluation will be the cost of the investigation. Evaluation of the cost of a proposed effort shall include the realism and reasonableness of the proposed cost (in the context of the anticipated level of effort required to successfully carry out the investigation), and the comparison of that proposed cost to available funds. NASA may consult with a subset of the Stage 1 peer evaluation panel to assist in conducting the Stage 2 evaluation. Following the Stage 2 review, the ASTRO-E Program Scientist will recommend a set of investigations (with suggested funding levels) to the NASA Selecting Official for final selection and award.

A total of \$2.5 million is planned for the support of guest observers for the present observing opportunity. It is anticipated that approximately 70 investigations will be recommended for selection. Successful proposers will be notified concerning the level of funding recommended for their investigation shortly after the Stage 2 review.

C.4 SCHEDULE

Included below is the schedule for the review and selection of proposals for this first cycle of U.S. observing time on ASTRO-E. Note that the dates of events planned beyond the Stage 1 proposal due date are subject to change.

<u>DATE</u>	<u>EVENT</u>
July 16, 1999	Announcement release
September 17, 1999	Stage 1 proposals due
December 15, 1999	Stage 1 selections announced
January 15, 2000	Stage 2 (cost) proposals due
January 24, 2000	ASTRO-E launch
March 1, 2000	Stage 2 selections announced
August 2000	Cycle 1 observations begin

Proposals may be submitted at any time before the proposal due date; those received after that date will be returned to the proposer.

C.5 EDUCATION AND PUBLIC OUTREACH

C.5.1 Scope of Program

The Office of Space Science (OSS) has developed a comprehensive approach for making education at all levels (with a particular emphasis on K-14 education) and the enhancement of public understanding of space science integral parts of all of its missions and research programs. The two key documents that establish the basic policies and guide all OSS Education and Outreach activities are a strategic plan, entitled *Partners in Education: A Strategy for Integrating Education and Public Outreach Into NASA's Space Science Programs* (March 1995), and an implementation plan, entitled *Implementing the Office of Space Science (OSS) Education/Public Outreach Strategy* (October 1996). Both of these documents may be obtained either by selecting *Education and Public Outreach* from the menu on the OSS homepage at <<http://www.hq.nasa.gov/office/oss/>>, or from Dr. Jeffrey Rosendhal, Office of Space Science, Code S, NASA Headquarters, Washington, DC 20546-0001.

In accord with these established OSS policies, proposers to any OSS NRA are strongly encouraged to include an Education/Public Outreach (E/PO) component as part of their scientific research proposal. In addition, anyone holding an existing multiple year research award funded through any previous OSS NRA is encouraged to propose an E/PO supplement to their award (see details in C.5.3 below). The following guidelines apply to all proposed E/PO activities:

- An E/PO activity will be funded only in conjunction with an award for a “parent” research proposal;
- The proposed E/PO activity is expected to have a general intellectual linkage to the science objectives of its “parent” proposal and/or the science expertise of its PI;
- The period of performance of the E/PO activity may not exceed that of its “parent” research award;

- Up to \$10K per year may be proposed for an E/PO program, although larger budgets may be considered, if funds permit, for a few exceptionally meritorious activities, and for “Institutional” E/PO proposals (see C.5.3); and
- NASA requests (but does not require) that the institutional overhead for an E/PO budget be waived by the submitting organization, since in many cases such activities will be of direct value to local educational and/or public science institutions and the budget available for this OSS E/PO program is extremely restricted.

E/PO proposals will be funded using funds separate from those for the research grants funded under this NRA, and E/PO funding is considered as an add-on over and above any funding guidelines for research proposals that may be given elsewhere in this NRA. E/PO proposals will be evaluated (see criteria below) by appropriately qualified scientific, education, and outreach personnel, and the substance of these reviews will be conveyed to the proposers as part of their debriefings. The OSS Selecting Official will take into account proposed E/PO tasks and their review ratings when deciding on final selections and funding levels and as an aid in discriminating between research proposals having otherwise comparable merits.

C.5.2 Evaluation Criteria

There are two classes of evaluation criteria against which proposed OSS E/PO activities will be evaluated. The general criteria to be applied to the evaluation of all proposals, which reflect requirements necessary for further consideration of an E/PO proposal, are:

- The quality, scope, and realism of the proposed E/PO program including the adequacy, appropriateness, and realism of the proposed budget;
- The capability and commitment of the proposer and the proposer’s team, and the direct involvement of one or more science team members in overseeing and carrying out the proposed E/PO program;
- The establishment or continuation of effective partnerships with institutions and/or personnel in the fields of educational and/or public outreach as the basis for an integral element of the proposed E/PO program; and
- The appropriateness of plans for evaluating the effectiveness and impact of the proposed education/outreach activity.

To ensure that the goals and objectives of the OSS E/PO strategy are realized in practice, proposals will also be evaluated using one or more of the following specific criteria. Because of the modest financial scope of this program, it is recognized that not all proposals can (or even should) address all of these specific factors. Therefore, only the applicable subset will be considered in evaluating each individual proposal. An educationally sound, well-posed and focused effort that will clearly be effective in reaching its intended target audience is preferable to an unrealistically broad effort. These specific criteria are:

- For proposals dealing directly with or strongly affecting the formal education system (e.g., through teacher workshops or student programs carried out at informal education institutions such as science museums and planetariums), the degree to which the proposed E/PO effort is aligned with and linked to nationally recognized and endorsed education reform efforts and/or reform efforts at the state or local levels;

- The degree to which the proposed E/PO effort contributes to the training, involvement, and broad understanding of underserved and/or underutilized groups in science and technology; and/or
- The potential for the proposed E/PO activity to expand its scope by having an impact beyond the direct beneficiaries, reaching relatively large audiences, being suitable for replication or broad dissemination, or drawing on resources beyond those directly requested in the proposal.

Although creativity and innovation are certainly encouraged, note that neither of these sets of criteria focuses on the originality of the proposed effort. Instead, NASA seeks assurance that the proposer is personally committed to the E/PO effort and that the PI and/or appropriate research team members will be actively involved in carrying out a meaningful, effective, credible, and appropriate E/PO activity; that such an activity has been planned and will be executed; and that the proposed investment of resources will make a significant contribution towards meeting stated plans and objectives. To aid proposers in the preparation of their proposals, as well as to ensure that reviews are carried out on a consistent basis aligned with the OSS Education Strategy and Implementation Plan, an *Explanatory Guide* to E/PO evaluation criteria has been prepared and may be found by linking through *Education and Public Outreach* at the Web site <http://www.hq.nasa.gov/office/oss/>.

C.5.3 Special Case E/PO Proposals

There are two special cases for the submission of E/PO proposals that may be considered by interested participants in OSS programs:

C.5.3.1 “Institutional” E/PO Proposals

Based on recent experience, OSS recognizes that multiple proposers from the same institution who are responding to the same NRA (or single program element within a multiple program NRA) may wish to submit a common, collaborative “Institutional” E/PO proposal. Such proposals should be of larger scope and would be expected to have a larger impact than that possible under the parentage of a single research proposal. Therefore, NASA OSS allows the submission of a common Institutional E/PO proposal involving an arbitrary number of proposers from that one institution subject to the following conditions:

- The identical E/PO proposal must be submitted in conjunction with every “parent” research proposal submitted from that institution for a single given program element. The Web page that is used for the submission of the E/PO proposal (see C.5.5 below) provides for entering information to indicate to OSS that the E/PO proposal is an Institutional Proposal. It must be clearly marked as an Institutional proposal, identify all the separate research proposals associated with it, identify a team leader for the overall E/PO effort (who may be someone from that institution other than one of the proposing Principal Investigators), and identify all participating personnel.
- Such an Institutional proposal will be reviewed only once by NASA, and a decision whether to fund that proposal (or parts of it--see below) will be made on the basis of that one review.

- The maximum funding that will be allowed for such an Institutional E/PO proposal is \$7.5K per year for each one of the parent research proposals with which the umbrella E/PO effort is associated.
- Because not all the parent research proposals associated with a particular Institutional E/PO effort may be accepted, the Institutional proposal must clearly identify how the different elements of the E/PO proposal are related to each other, discuss the consequences of a partial selection (and concomitant funding limitation), and clearly demonstrate the continued viability (including arrangements for leadership of the overall effort) of the proposed program should a partial selection be offered. The page limit for an Institutional E/PO proposal is expanded to five pages (one extra page from that indicated in C.5.5 below) to allow discussion of these issues.

C.5.3.2 E/PO Proposal as a Supplement to an Existing, Multiple Year OSS NRA Award

The PI of an existing multiple year award selected through any OSS NRA (including this one) having at least one year remaining in its period of performance may submit an E/PO proposal as a supplement to that parent research award. The period of performance for such a supplemental E/PO activity is limited to the balance of the period of performance of the research award. Such a supplemental E/PO proposal should be prepared as a stand-alone package following the format and content guidelines given in C.5.5 and submitted in each of two ways:

- (i) as two hard copies submitted with the Progress Report required for the annual funding allotment needed to continue the parent award; and
- (ii) as an electronic submission to the Web site identified in C.5.5 (note: for this option, the Web site will request the information needed to coordinate the E/PO supplement with its parent research award, in particular, the grant or contract number and title of the “parent” award, the names of the NASA science program and Discipline Scientist under which that award was first made; and the anniversary date of the parent award).

Such E/PO supplement proposals will be reviewed using the evaluation criteria described above, and, if accepted, the E/PO funding is restricted to start on the anniversary date of the parent award.

C.5.4 Assistance for the Preparation of E/PO Proposals

NASA OSS has established a nationwide infrastructure of space science education/outreach groups whose purpose is to directly aid space science investigators in identifying and developing high quality E/PO opportunities. This infrastructure provides the coordination, background, and linkages for fostering partnerships between the space science and E/PO communities, and the services needed to establish and maintain a vital national, coordinated, long-term OSS E/PO program. Of particular interest to proposers to this NRA are two elements of this system (which are also described in more detail in the OSS education/outreach implementation plan referred to in Section 1 above):

- Four OSS science theme-oriented E/PO “Forums” to help orchestrate and organize in a comprehensive way the education/outreach aspects of OSS space science missions and research programs, and provide both the space science and education communities with ready access to relevant E/PO programs and products; and

- Five regional E/PO “Broker/Facilitators” to search out and establish high leverage opportunities, arrange alliances between educators and OSS-supported scientists, and help scientists turn results from space science missions and programs into educationally-appropriate activities suitable for regional and/or national dissemination

Prospective proposers are strongly encouraged to make use of these groups to help identify suitable E/PO opportunities and arrange appropriate alliances. Proposers should be careful to note that these Forums and Broker/Facilitators have been established to provide help, but the responsibility for actually developing the E/PO program and writing the proposal is that of the proposer. Points of contact and addresses for all of these E/PO Forums and Broker/Facilitators may be found by opening *Education and Public Outreach* from the menu of the OSS homepage at <http://www.hq.nasa.gov/office/oss/>.

C.5.5 Preparation and Submission of an E/PO Proposal

In order to be considered for evaluation, E/PO proposals must adhere to the following formats and also must be submitted both electronically and in hard copy as described below.

- An E/PO proposal is to consist of a contiguous body and budget:
 - The body of the E/PO proposal is limited to four pages ($\leq 17,000$ characters, including spaces, using the fonts and page layouts specified elsewhere in this NRA) and must include the following parts: a brief abstract of the proposed activity (not to exceed 800 characters); an expanded description of the E/PO objectives and planned activities; a description of the intended involvement of the Principal Investigator and/or key science team members in the proposed E/PO effort; a description of any educational personnel who are involved in the effort, including proposed partnership institutions (together with specific indicators of commitment on the part of partners where appropriate); a description of how the effort will be managed; and a brief explanation of the requested E/PO budget. Note that the PI or one of the science team members of the parent research proposal must have the prime responsibility for overseeing the implementation of the proposed E/PO activity. The responsible individual should be clearly identified in the body of the E/PO proposal.
 - The period of performance of an E/PO activity may not exceed that of the parent proposal. The E/PO budget must be summarized for its intended total period of performance, as well as for each individual year thereof, using the format entitled *Budget Summary for Optional Education/Public Outreach Proposal* given at the end of this section (therefore, an E/PO effort proposed for a three year period of performance will require four budget sheets).

- An E/PO proposal (both body and budget) must be submitted by each of two separate ways:
 - As an electronic submission (for the evaluation process) by uploading it, including its *Budget Summary* sheets, to the secure Web site <<http://cass.jsc.nasa.gov/panel/>>, which provides instructions for this activity using a wide variety of formats. In accordance with the size limits specified above, the peer evaluations will consider only the first 800 characters submitted for the E/PO abstract and 17,000 characters for its body. Proposers without Web access or who experience difficulty in using this site may request assistance from the Lunar and Planetary Institute by E-mail at <panel@lpi.jsc.nasa.gov> or by phone at (281) 486-2137; and
 - As part of the total hard-copy version of the research proposal (see the ordered list of component parts for proposals elsewhere in this NRA); also note that the *Cover Page* for the research proposal must indicate that an E/PO proposal is included by checking the appropriate notification on the form provided on the Web site for its submission.

C.5.6 Reporting Activities for Approved E/PO Proposals

In order to assist OSS in obtaining a coherent picture of the entire portfolio of E/PO efforts supported across all OSS programs, the appropriate OSS Education Forum (see C.5.4 above) will contact proposers whose NRA E/PO components are selected to obtain summary information concerning the nature of and intended audience for their selected E/PO effort. In addition, a brief E/PO progress report will be required in conjunction with the annual progress report required for the continuation of the parent research award. A more complete report will also be required at the completion of the E/PO activity. The Education Forums will supply a simple template for preparation of such reports.

C.5.7 Additional Information

Questions about this E/PO program may be directed to:

Dr. Jeffrey Rosendhal
 Office of Space Science
 Code S
 National Aeronautics and Space Administration
 Washington DC 20546-0001
 Telephone: (202) 358-2470
 E-mail: jrosendh@hq.nasa.gov

Finally, attention is also called to the Initiative to Develop Education through Astronomy and Space Science (IDEAS) program administered by the Space Telescope Science Institute (STScI) on behalf of OSS. The IDEAS program is open to any space scientist based in the U.S. regardless of whether or not they hold a research grant from NASA OSS. This program, which selects proposals yearly, provides awards of up to \$40K to foster the development of innovative approaches to space science education and outreach by space scientists and their educator partners. The annual solicitation for the IDEAS program is typically released in July with proposals due in October. The annual request for proposals is posted at <http://opposite.stsci.edu/pubinfo/edugroup/ideas.html>. Inquiries may be addressed by E-mail to [<IDEAS@stsci.edu>](mailto:IDEAS@stsci.edu) or by postal mail to:

IDEAS Program
Office of Public Outreach
Space Telescope Science Institute
3700 San Martin Drive
Baltimore, MD 21218

BUDGET SUMMARY
for
OPTIONAL EDUCATION/PUBLIC OUTREACH PROPOSAL

For (check one):

___ **Total Period of Performance from (M/D/Y)** _____ **to** _____
/or/
___ **Year** _____ **of** _____ **from (M/D/Y)** _____ **to** _____

1. Direct Labor (salaries, wages, and fringe benefits) _____
2. Other Direct Costs:
 - a. Subcontracts _____
 - b. Consultants _____
 - c. Equipment _____
 - d. Supplies _____
 - e. Travel _____
 - f. Other _____
3. Facilities and Administrative Costs _____
4. Other Applicable Costs: _____
5. SUBTOTAL--Estimated Costs _____
6. Less Proposed Cost Sharing (if any) _____
7. Carryover Funds (if any)
 - a. Anticipated amount : _____
 - b. Amount used to reduce budget _____
8. Total E/PO Estimated Costs _____

Filling Out ASTRO-E Proposal Forms

D.1 Introduction and Instructions for Individual Forms

ASTRO-E proposals must contain hard copies of two forms: the Cover Page and the Target Form. Each target form has space for up to five targets; for proposals with a larger number of targets, RPS will automatically generate additional Target Forms. This document is meant to provide guidance in filling out the entries on these forms that are not self-explanatory. Additional information may be found in the ASTRO-E Technical Description, available upon request from the ASTRO-E GOF or electronically at the addresses given in the Solicitation Announcement.

Electronic submission of the Cover Page and Target Form(s) is also required. Individuals not having access to the Internet should contact Dr. Nicholas White at least two weeks prior to the proposal due date at the address given in the Solicitation Announcement.

The ASTRO-E GOF provides the capability to submit forms electronically and, at the same time, to generate hard copy output, by the use of the Remote Proposal Submission (RPS) software. This software provides a “user friendly” means of entering, checking, electronically mailing, and printing of the proposal forms, and can be accessed via the WWW or by automated E-mail interaction. A description of the use of the software is available via the GOF homepage at <http://astroe.gsfc.nasa.gov/>, and from the anonymous FTP account on [astroe.gsfc.nasa.gov](ftp://astroe.gsfc.nasa.gov).

Network glitches may (very occasionally) affect the integrity of RPS files. The proposal author is strongly urged to verify the contents of the electronic RPS files prior to submitting proposals by printing out the forms and reading them carefully.

D.2 Cover Page

Most items on this form are self-explanatory, but there are a few items which are commonly filled out incorrectly. Please refer to the following sections for hints on the proper completion of the forms.

D.2.1 Principal Investigator

Only one person is to be designated as Principal Investigator. Use Dr., Prof., Mr., Ms., or whatever is appropriate.

D.2.2 Proposal Title

Please keep the title succinct; there is a 120-character limit.

D.2.3 Subject Category

Please choose the one entry from the list below that best describes the observation. The choice will not affect how the proposal is rated. The proposals will be assigned to a review panel on the basis of whether the investigation addresses Galactic or extragalactic observing objectives. The user should make a reasonable category choice for the proposal.

The categories are:

1. Solar system, stars, and star forming regions
2. Cataclysmic variables and x-ray binaries
3. Galactic diffuse emission (including supernova remnants and the Galactic center)
4. Extragalactic compact sources (including active galactic nuclei and gamma-ray bursts)
5. Extragalactic diffuse sources (including clusters and galaxies)

D.2.4 Number of Targets

RPS fills this entry automatically. Raster targets count as a single target.

D.2.5 Target of Opportunity (TOO)

The box should be checked if the proposal requests Target of Opportunity (TOO) status. If the proposal is selected, time will be awarded but will remain unscheduled until the opportunity occurs. The trigger for the TOO observation should be described in the “remarks” section. Note that it will be the proposer's responsibility to notify the ASTRO-E GOF that the opportunity has occurred. Note also that a proposal must not contain a mix of TOO targets and non-TOO targets.

D.2.6 Co-Investigator(s)

An investigation may involve the participation of one or more Co-Investigators. Proposers are encouraged to designate one of the Co-I's as an alternate point of contact in the event of the unavailability of the PI. It is also requested that any other Co-I's be listed in decreasing order of participation in the proposed project. For instance, list first a graduate student or postdoctoral associate who is expected to perform the analysis but who, for administrative reasons, was not allowed to be the PI.

D.2.7 Co-I Contact

Communication between the planning and operations teams and the PI or her/his designated contact may be necessary at any time prior to an observation. Although designation of such a contact is optional, it could be extremely helpful if a decision about observing modes must be made rapidly and the PI is unavailable. If designation of a contact in addition to the PI is desired, enter “Y” and provide a network address and phone number. The contact should be the first listed Co-I.

D.2.8 Abstract

The abstract must not exceed 800 characters and should be understandable to someone familiar with the field but not necessarily an expert. Use ordinary ASCII characters only; do not embed LaTeX control characters. The abstracts of approved proposals will be made available via Argus.

D.2.9 Institutional Endorsement

This form serves as the cover page for both the stage 1 (scientific) and stage 2 (cost) proposals. NASA does not require institutional endorsement for stage 1 proposal submission. A proposer's institution may have an internal requirement for endorsement, however. Proposers are expected to be aware of the requirements of their home institution. An endorsement from an institutional administrator with the appropriate level of authority is required for stage 2 proposal submission.

D.3 **Target Form**

D.3.1 Target Summary Information

D.3.1.1 Target Number

Order targets by observing priority from highest to lowest (i.e., target 1 = highest priority). The review panels will be instructed to honor the stated priority if they find it necessary to recommend reduction in the number of targets.

D.3.1.2 Target Name

The name will be printed/transmitted in upper case. Please use commonly accepted names for objects (NGC xxxx; PKS xxxx+yy; Gxxxx.x+y.y) so that overlap checks are made easier.

D.3.1.3 Right Ascension, Declination

Coordinates should represent the celestial coordinates of the center of the XRS field of view. For most point sources, this will coincide with the source coordinates. For extended sources, indicate the coordinates of the center of the XRS field of view, not just a cataloged source position (unless specifying a raster, in which case the specific coordinates of the raster pointings should be entered into the "Remarks" area). Use J2000 coordinates. The ASTRO-E team will not be responsible for pointing errors due to incorrect or unprocessed coordinates. If proper motion is important, specify an epoch within the Cycle 1 observing period.

Enter coordinates carefully. Use leading zeroes when necessary. The software may not read the coordinates properly if leading zeroes are not present (e.g., enter 02 03 07 rather than 2 3 7).

D.3.1.4 Observing Time

The unit for this number is kiloseconds. Enter the net time required to meet the observational goals. The minimum allowed time for a pointing is 20 ksec (see §C.1.1). For raster observations, enter the total time. Details of the raster should be entered in the “Remarks” box and explained in the proposal text.

D.3.1.5 Number of Observations

The default entry is “1.” It should be more than one only if a constraint exists or if a raster observation is being proposed. If a constrained observation is requested, then the appropriate entries in the Target Constraints section must be filled out. If a raster observation is requested, provide details in the "Remarks" section and in the justification.

D.3.1.6 Time Critical Observations

The default entry is "N." If time-critical observations (see §A.4) are required to carry out the proposed investigation, please enter "Y."

D.3.1.7 XRS Filter

The XRS has five different filters to reduce the flux of a bright source to an acceptable level. The possible filter settings are:

1. “Open” – no filter
2. “ND25” - Neutral density filter with 25 percent transmission
3. “ND05” - Neutral density filter with 5 percent transmission
4. “ND01” - Neutral density filter with 10 percent transmission
5. “BE1” - 100 μm Beryllium filter
6. “BE3” - 300 μm Beryllium filter

The default entry is “Open.”

D.3.1.8 Estimated XRS Count Rate

An estimated count rate in counts/sec is requested for the XRS. The count rates for a given model can be obtained by using the Portable Interactive Multi-Mission Simulator (PIMMS) or WEBSPEC. PIMMS is a software tool used for estimating count rates for a specified model. WEBSPEC is a Web-based spectral simulation tool. Both PIMMS and WEBSPEC are available via the ASTRO-E GOF web site, on the “Proposal and Planning Tools” page.

D.3.1.9 XIS Mode

The XIS Mode entry is a concatenation of three separate items relating to XIS operation: data mode, window mode, and burst mode flag. RPS allows separate specification of each, and then constructs the appropriate table entry. The meaning of the modes is explained in the ASTRO-E Technical Description. Briefly, the data mode establishes the number of pixels telemetered for a detected event. The choices are 5x5 (“5” – the default), 3x3 (“3”), 2x2 (“2”), or fast (“F”). The window mode indicates how often per 8 second frame time data are read out from the CCD, and thus determines what fraction of the CCD area is read out. The default value is “0,” corresponding to full frame readout once per 8 seconds. Options are 4 (2 second readout interval of 1/4 of the CCD), 8 (1 second readout interval of 1/8 of the CCD), and 16 (0.5 second readout interval of 1/16 of the CCD). Burst mode can be used, e.g., to expose the full frame for 1 second out of the 8 second frame cycle. Burst and window mode can be used separately or in combination for bright sources. The options are “N” (default) for burst mode off and “Y” for burst mode on.

D.3.1.10 Remarks

Default entry is "N." Enter "Y" if clarification of any of the parameters of the observation is desired, and provide details in the "Target Remarks" section of this form.

D.3.2 Target Constraints

The only targets having entries in this area are those for which the “Time Critical” flag has been marked as “Y.”

D.3.2.1 Coordinated Observations

This category of constraint is intended for multibandpass observations. The entries consist of the start and stop times (Year, Month, Day, Hour, Minute) for the coordinated observation. The times should be absolute times (UT). If a target has multiple coordinated windows, such as an observation in September 2001, and another in March 2002, PI’s should propose these as two targets, with a comment in the Remarks section linking them.

D.3.2.2 Monitoring Observations

This category is intended for repeated, regular visits to a particular target(s). The primary consideration is not when the observation is scheduled but the interval between visits. Note that the time interval must be specified as a minimum and a maximum interval, where the units are in kiloseconds, to permit the scheduling software some flexibility in producing the observing schedule. If a proposer wishes to do (for example) both a daily and weekly monitoring campaign, these should be specified as two targets, with a comment in the Remarks section linking them. Monitoring campaigns with more complex structures, e.g., logarithmic separations, are still to be considered as a special case and must be specified entirely in the Remarks section.

D.3.2.3 Phase-Dependent Observations

This category is intended for observing at a particular phase of a periodic phenomenon. The epoch (MJD = Modified Julian Date) and the period (in days) must be specified. In addition, the phase range that the observation will cover must be specified as the minimum and maximum phases (in other words, the observation will begin near the “minimum” phase and continue until approximately the “maximum” phase). No time outside of that interval will be scheduled. It will be the proposer's responsibility to see that the requested exposure time is an appropriate match to the length of time to be covered by the phase constraint. Separate phase intervals should be specified as distinct targets.

D.3.2.4 Roll Dependent Observation

The field of view of the XRS is not symmetric. The long direction is oriented N-S at a roll angle of 0 (or 180). Proposers requesting a specific orientation of the XRS to cover an extended feature should specify the minimum and maximum acceptable roll angle. Please note, however, that a limited range of roll angles will be allowable for most celestial orientations. It is the proposer's responsibility to verify the technical feasibility of a roll-constrained observation. Software tools for doing this are accessible from the ASTRO-E GOF Web page.

D.3.3 Target Remarks

The Remarks box should be used to explain any entry that may not be clear to the scientific and technical review panels, or to the GOF staff. In particular, the Remarks box should be used to explain a raster observation, a TOO observation, or a technically demanding observation that cannot otherwise be covered by the Target Constraints box.